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| 10/696,882 | 10/30/2003 | Stefan Bader | 5367-47 | 9126 |

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| EXAMINER |
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RAO, G NAGESH

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| ART UNIT | PAPER NUMBER |
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1722

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06/21/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/696,882

Applicant(s)

BADER ET AL.

Examiner

G. Nagesh Rao

Art Unit

1722

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 June 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-13 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10/30/07 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

1) Claims 1-6 and 11-12 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Ohba (US Patent No. 6,242,764).

Ohba 764 pertains to a method for fabricating a III-N semiconductor light emitting element having strain moderating crystalline buffer layers. According to Ohba 764's specification the object of the invention shows a variety of ways of depositing an AlGaInN layer ontop of a SiC substrate while having a thermal absorption layer underneath the SiC substrate for exhibiting a good absorption of thermal radiation (See Col 2 Lines 15-68, Col 9 Lines 15-43 (5th Embodiment) and Figure 6). Examiner points out to figure 6 which clearly shows a SiC substrate (501) with a Al/Ti n-side electrode (522) reason being that an electrically conductive material is used for forming the substrate and an electrode is mounted to a back surface of the conductive substrate, with the result that the p-side electrode can be brought into contact with a heat dissipitator, suggesting that the underlying layer 522 is acting as a thermal absorption layer means.

Finally the layers of AlGaInN or variations of the like are deposited via an MOCVD apparatus although described in the 6th embodiment it is explicitly stated to be also utilized in the 5th embodiment (See Col 9 Lines 45-59) whereby the SiC substrate is put on a susceptor which also acts as a heater thus capable of heating

the substrate to the deposition temperature (See Col 9 Lines 60-68 and Col 10 Lines 1-29).

Although applicant states their method is performed via MOVPE, MOCVD is understood in the art to be an alternative term for MOVPE. In anticipation of applicant's objection, examiner submits evidence of such claim from the textbook "Electronic Materials Science For Integrated Circuits in Si and GaAs by James Mayer and S.S. Lau, as well a proper cited definition by Wikipedia.

It would be understood that if the heating capabilities of the MOCVD apparatus utilized in Ohba 764 would essentially effect the method step (c) claimed by applicant by means of thermal radiation and would inherently be used to generate thermal radiation from the heating source having a spectral range for which the thermal radiation absorption layer exhibits good radiation absorption.

Applicant's contend to the teaching of the deposition of the thermal absorption layer to the substrate prior to the growth of the structure on said wafer. This limitation is viewed as a resultant effective variable that can be ascertained by one having ordinary skill in the art at the time of the invention to implement as desired by the operator.

Therefore it would be obvious to one having ordinary skill in the art at the time of the present invention given the known details of Ohba 764 and well known

processing parameters towards MOVPE substrate structure fabrication to deposit said thermal absorption layer either at the beginning of device fabrication or at the end of the device fabrication, being that the same structure resulting occurs and the methodology is applied in an analogous manner based on the operator's chosen optimized parameter setting.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

2) Claims 7-10 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ohba (US Patent No. 6,242,764) in view of Hirano (US Patent No. 5,771,110).

From the aforementioned Ohba 764 pertains to a method for fabricating a III-N semiconductor light emitting element having strain moderating crystalline buffer layers that reads on parts of applicant's claimed invention.

However Ohba 764 fails to explicitly teach sputtering as a technique for depositing a thermal radiation absorption layer.

In a method pertaining to thin film structure device techniques Hirano 110 teaches that it is known to use a sputtering technique for deposition of a thermal absorption layer film (See Col 15 Lines 19-40 and Col 16 Lines 30-65).

It would be obvious at the time of the invention to one with ordinary skill in the art to modify the teachings of Ohba 764 with Hirano 110 by employing a sputtering technique because the higher rate of deposition results in lower impurity incorporation because fewer impurities are able to reach the surface of the substrate in the same amount of time. Sputtering methods are consequently able to use process gases with far higher impurity concentrations than the vacuum pressure that MBE methods can tolerate. During sputter deposition the substrate may be bombarded by energetic ions and neutral atoms. Ions can be deflected with a

substrate bias and neutral bombardment can be minimized by **off-axis sputtering**, but only at a cost in deposition rate.

Furthermore Hirano 110 teaches the advantages of using an amorphous based silicon layer preferably doped as a type of thermal absorption layer, albeit it teaches a variety of doping ranges and thickness ranges for the thermal absorption layer it does not indicate any specified reasons as to why those dimensions are desired. Examiner notes that applicant too has denoted thickness and doping values, but in the specification there is no apparent reason or significant explanation teaching why those traits are desired.

Therefore it would be obvious at the time of the invention to one with ordinary skill in the art to modify the teachings of Ohba 764 to utilize a thermal absorption layer such as a doped silicon layer (which is denoted as a non-metallic layer) from the teachings of Hirano 110 underneath a SiC substrate to be able to have lattice coordination and avoid lattice mis matchings with two silicon based materials rather than a silicon and non-silicon based material, and as well derive the same benefit of a thermal absorption layer as desired by Ohba 764.

Response to Arguments

3) Applicant's arguments filed 6/01/07 have been fully considered but they are not persuasive.

With respect to the language pertaining to the application of deposition step with respect to the thermal absorption layer, the prior art does indeed show it being capable of either being applied before construction of the device's growth area of the substrate wafer or after. Applicant's lay claim to this specific step as being crucial, and of course until currently applicant's faced a 35 USC 112 1st paragraph for new matter which has been rectified. Nonetheless this limitation as being met by the conditions of the prior art put forth as being an anticipated/un-obviated limitation sees no reason why this technique makes it special for this particular process. If applicant's can prove via a 37 CFR 1.132 affidavit/declaration that this technique/step would not be known via the prior art and/or known to one having ordinary skill in the art at the time of the present invention, then reconsideration by examiner would be strengthened to the validity of the claimed invention by applicant to properly traverse the current rejection set forth.

Examiner notes that the prior art put forth pertains to a method making an LED and notes that this method although specific anticipates the broadness of applicant's claimed invention.

The argument put forth regarding the teachings of Ohba 764's thermal absorption layer as interpreted by examiner still stands. Examiner respectfully appreciates applicant's argument, however the AlTi layer as shown in figure 6 albeit a heat dissipator is acting as a means for thermal absorption layering. Because it is doing so, this reads on applicant's invention, and although Ohba 764 teaches and uses the term heat dissipator it should be appreciated and understood that the layer also functionalizes as a thermal absorption layer thus reading on claimed invention.

In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, given the relevance of analogous art and benefits Hirano 110 imparts would benefit in optimizing Ohba 764's teachings with respect to claims 7-10.

Furthermore examiner has noted that the current set of arguments did not rebut examiner's prior arguments regarding the validity of the combination thus implicitly agreeing with examiner's assertion that the 103 rejection was valid.

Conclusion

4) Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to G. Nagesh Rao whose telephone number is (571) 272-2946. The examiner can normally be reached on 9AM-5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Yogendra Gupta can be reached on (571)272-1316. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

DUANE SMITH
PRIMARY EXAMINER

D. Smith
6-19-07

GNR